

Water Resources Department

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February 8, 2017

Dan Schleigh, Manager, B Bar K Cascade Ranch PO Box 558 Eagle Point, OR 97524

Re: 2016 Inspections of B Bar K Cascade Ranch Dams: Woodrat Knob (W-43); Lake Creek (L-24); Osborne (O-15) Bradshaw 1 and 2 (B-24, B-83), Frog Pond (F-30), Harrison (H-47)

The high hazard dams were inspected on June 7, 2016. I performed the inspections with Water Resources Engineer, Lyndsey Croghan and District 13 Watermaster, Travis Kelly. On November 3, 2016, Shavon Haynes, Acting Watermaster along with Tony Janicek, Dam Safety Coordinator and Benjamin Thorpe, Assistant Watermaster, inspected the other four dams that are not high hazard.

Summary: There is one major safety issue at all three high hazard dams and at three of the significant hazard dams (Bradshaw 1, Harrison, and Frog Pond). The issue is the near complete deterioration of the low level conduits at the dams. These dams had corrugated metal culverts installed in or about 1960, and these pipes are not long lasting. Regular maintenance of vegetation and debris has been very good, and you have worked with us on an emergency action plan (EAP) for the three high hazard dams. I have attached a working draft EAP for these three dams for your use and review (needs the equipment rentals and pumps you might use, plus a review by Jackson County.

#### Results of Inspection - Lake Creek L-24



Spillway control section with reservoir in background

The reservoir level was 9.2 feet below the dam crest when inspected. Minimum freeboard was 4.2 feet. Based on measurements and analysis, the spillway capacity appears sufficient to pass an extreme flood. The reservoir was clean.



Low level conduit is deteriorated

The corrugated metal culvert that serves as the low level conduit through this dam continues to deteriorate slowly. The holes are slightly larger, and there is also a cut in the pipe from we believe an engineers' attempt to evaluate the conduit with a remote camera. If the valve is completely open, it is very likely to leak significantly from these locations, and cause erosion of the embankment and native materials in this general location.



Outlet structure disconnected

The outlet works structure is heavily overgrown, and generally disconnected from the outlet pipe. The ground in this area is always wet and poorly drained, as evidenced by the

foxtail plants that are growing all around it. The trees (red alders) are also causing damage to the outlet structure.



Excellent vegetation cover, some seepage

Both the upstream and downstream faces have a well maintained cover of grass, with very little woody vegetation. The only sign of seepage was in a few areas around the toe, with no observed leakage through the dam. We saw no sign of significant settlement or other indications of embankment instability.

#### Woodrat Knob W-43



Reservoir with dam in background

The reservoir level was 9.5 feet below the dam crest when inspected. Minimum freeboard was 6.3 feet, which is excellent. The reservoir was clean, with no logs or debris near the

dam. Both the up and downstream faces have a well maintained grass cover. The access and security at the dam are both good.



Crest of dam

The crest of the dam shows no sign of instability. There is no sign of reactivation of movement that caused a near failure of this dam in 1961. However, we have no information on water pressures inside the dam, as the piezometers (one shown on the downstream face in the photo above) have long been out of service.



Outlet of conduit

This dam has no low level outlet, probably because of the aforementioned near failure. This 18 inch culvert was placed at mid-elevation after that near failure. The culvert has deteriorated badly, and has reached the point where action is necessary to prevent this from becoming an unsafe condition. This culvert should be inspected if possible and either replaced, or if safe, relined.



Seepage from failed drains

The seepage is caused by blockages and failure of the culverts installed in the early 60's to stabilize the dam after the major landslide. New drain pipes are necessary to ensure the stability of the berm and its ability to keep the dam stable. These drains are believed critical, as they reduce water pressures within the dam. Excess water pressure from water seeping through the dam likely caused the large failure in 1961.



New spillway

The new spillway had flow for the first time in the winter and early spring of 2016. The spillway handled these flows with no erosion at all. This structure has greatly improved the safety of Woodrat Knob dam, at least in eliminating the potential of an overtopping failure due to a flood.

#### Osborne (O-15)



Reservoir and crest of dam

The reservoir level was 10.2 feet below the dam crest when inspected. Minimum freeboard was 4.5 feet, which is adequate. There is a little more woody vegetation on Osborne dam than on the other two dams inspected during this trip. The crest and embankment appear stable.



Valve was cycled

The control was operated for the first time in the last 5 years. It is nearly past its useful life. You will need an alternative that will be essential for draining water from the dam, both for maintenance, and in the event of an emergency. It may also be possible to construct a new outlet that is more conducive to your irrigation operations.



Inside of conduit

The inside of the outlet culvert is corroded, but we did not observe holes in the structure yet. This pipe will continue to deteriorate, and will become unsafe at some point in the not too distant future. On a positive note, you were able to operate the valve this year, and determine that both the valve and conduit are operational right now.



Brush regrowth around outlet

There is brush at the toe of the dam and there is seepage. The seepage is not collected, so it is not possible to determine if the rate of seepage is changing. The rest of dam has mostly grass cover and nothing restricts inspection. We observed no signs of instability on this dam, at this time.

### Other Dams (not rated high hazard)

### Bradshaw 1 (B-24)



Deteriorated outlet conduit

There is water leaking from the low level outlet conduit. It is not clear if the leak is from within the conduit or from around the exterior of the conduit. The visible section of the corrugated metal pipe outlet is highly corroded and should be addressed.



Main dam

The dam and auxiliary dam show signs of bovine activity. Cattle should be kept off these structures in order to preserve the integrity of the dam and its storage maximum capacity.

#### Bradshaw 2 (B-83)



Cattle activity on the crest of the dam

There is abundant cattle activity along the crest and downslope of the dam. There is a clear pathway eroded on the downslope face that may promote erosion. Trampling of the crest can reduce freeboard and total storage of the reservoir. We recommended keeping cattle off the structure in the future in order to preserve its integrity in the long term. There are several small oak saplings along the down slope of the dam. These should be removed before they have the opportunity to compromise the structure.

#### Frog Pond (F-30)



Outlet of low level conduit

Inlet to low level conduit

The inlets and outlet and control structure for the low level conduit are deteriorated with unclear functionality. We suggest cycling the outlet at least once per year to ensure the ability to release water in the event of an emergency.

The down slope, right abutment, toe, and the auxiliary dikes are all overgrown with woody vegetation. This should be remedied in order to avoid/mitigate damage to the integrity of the structures. This reservoir appears to not currently be in use. Please contact us if you intend to resume storage. It is recommended that regular maintenance is continued on this structure in the interim.

#### Harrison (H-36)



Road maintenance on the crest of the dam

This reservoir appears to not currently be in use. Please contact us if you put this dam back into service. We recommended that you continue regular on this structure in the interim.



Numerous trees on auxiliary dam

While we were on site there appeared to be road improvement occurring along the crest of the dam. Any heavy equipment used may have lowered the crest and consequently the available freeboard. Additionally, there was abundant vegetation growing along the left abutment, left auxiliary dike, and potentially within the channel of the spillway.



The control structures and outlet are corroded and partially buried. This may need to be addressed prior to resuming use of this reservoir. It is prudent the outlet be fully functional, as it is the only way to release water from the reservoir in the event of an emergency.

#### **Progress Needed - High Hazard Dams**

As we have discussed for a number of years, the conduits through these dams are deteriorated and are a serious safety concern. This safety concern continues to increase with each passing year and further deterioration of the conduit. The dam will not be safe until there are no conduits that can develop holes and cause internal erosion or slope instability. Internal erosion and slope instability are the cause of many dam failures, and a landslide in 1961 almost caused failure of Woodrat Knob dam.

It may be acceptable to install new pipes at locations other than the bottom of the dams. Under this alternative, grouting of the old pipes would be necessary. Pipes at alternative locations may require less excavation and may allow for a more efficient irrigation system. These pipes would need to be located so that they allow use of the water and so they can lower the reservoir in an emergency. An engineer, or a small team of engineers, may be able to design an efficient solution that improves your ability to use water, and one that also could lower any dam quickly and effectively in an emergency.

As with the spillway at Woodrat Knob dam, it is essential that you bring these dams into fully safe and operational condition. At this point, there is still time to avoid action under ORS 537.350 through 537.390; however, a timeframe developed by an engineer is necessary. The choice of engineer is yours. Please call us if you would like help formulating potential questions for the engineer with regard to meeting the needs of your operation as well as the needs of dam safety.

#### **Specific Recommendations**

- 1. Address the conduits on all three high hazard dams, so that all can safely lower water levels and provide continuous service as essential for these dams. Please consult an engineer for this work. It may not be essential to replace the conduits in same location. The conduits must be able to lower the reservoir significantly, but not necessarily to the bottom level. Work with an engineer who is knowledgeable about irrigation and dams. They may be able to consider this work for the other dams as well as make your entire irrigation system more efficient.
- 2. Install new toe drains on Woodrat Knob Dam.
- 3. If existing pipe locations not used, grout the old pipes.
- 4. Let us know if we need to make any changes to this working copy of an emergency action plan for the three high hazard dams.
- 5. Continue overall very good control of vegetation and animals on the dams.

We use a standard inspection form, and a copy of the field inspection sheet for this dam is attached. We plan on another routine inspection of the three high hazard dams next year. Please let us know if you have any questions about this inspection.

I would be happy to discuss the necessary work, and consultants who might be able to work together to develop an action plan to make the dams as safe and useful as is practicable.

Sincerely,

Keith Mills, P.E., State Engineer

(503) 986-0840

Cell (541) 706-0849

C: Travis Kelly, Watermaster District 13 Dam Safety Files (W-43) (L-24) (O-15) (B-24, B-83) (F-30) (H-47)

**Attachment: Working Draft Emergency Action Plan** 



Name of Dam:	Woo	drat	i					Fil	le#: <u> </u>	)-43
Height: _ 90	ft. 5	Storage: /	789	ac. ft. P	ermit:		NID			
Hazard: Lov		_						· · · · · · · · · · · · · · · · · · ·		
Inspector(s):k	eith	mills. L	undse	y Cro	anan			Waterm	naster Dist	rict: <u>13</u>
Others on site:										
Date: <u>6/17</u>						not				
Prior Inspection	ı Date: _	4/22/	2015		Issues fro	m prior in	spection:	out	let po	ipe-
toe dr	ains	ς							· ·	
Expedited Re-in	spection	Needed:	Next Ins	spection I	Date:	017				
Rating Criteria	: 5-Very	good; 4-Ade	quate 3-M	<i>faintenand</i>	e or mino	r repair n	eeded			
2-Serious repair	ir needed	i; 1- Urgent	dam safei	ty issue –	action no	w - Conta	ct dam ov	vner and	dam safei	'y engineer
directly										
I, Dam	☐ £ar	th 🗌 Ro	ck [	]Concret	e 🔲	Other				Rating
Up. Slope		on, Animals, l rass coves		ave Action	ı, Depressi	on, Whirlp	ool adjacer	nt		4
Crest Width, Surfacing, Vegetation, Trampling, Depression, Cracks, Breaching  \$\int rass \cover \text{cover}\$									4	
Down. Slope Vegetation, Animals, Erosion, Seepage, Leak (muddy), Bulge, Depression, Slide									4	
R. Abutment Vegetation, Animals, Erosion, Seepage, Leak (muddy)									4	
L. Abutment Vegetation, Animals, Erosion, Seepage, Leak (muddy)								4		
Toe Vegetation, Erosion, Seepage, Leak (muddy), Boil									3	
G # 1.0		i, seep								
Seepage/leak flo			Center					om (use co	mment)	
Auxiliary dike (		No Yes		2 🗆			over 5			
Comments:	Se	epage o	ntop	07 K	verm;	just u	vet spo	t belo	nw dan	n
II. Reservoir	I	Pool elevatio	n: -9	7,5	Point	of Refere	ence:	eves f		Rating
Minimum freebo	CONTRACTOR OF THE CONTRACTOR	Vertical distan						<u>Crest</u>		4
Floating Debris/	Trash 1	Clean	Aroun	d reservoir	Пи	ear spillwa	ıy			4
Log Boom		Not needed	l 🔲 Pres	sent 🔲 1	Needed [	Deterior		Ineffecti	ve	<del>-</del>
Unusual Conditi	ons [	None 🗌	Active La	ndslide [	Wildfir	e in Waters	shed [	Other (cor	nments)	
Comments:	c	urrent	water	· level	9.5'	below	w cr	rest-		
III. Toe Drains	#			. —				1		
Flow (gpm)		3								
Damage		buried								
Sediment		Clear								
Rating		1)-								

IV. Conduit Con	trol: Manual Power Other Conduit Control missing	Rating						
Inlet	Submerged Debris on Trash Rack Deterioration							
Trickle tube	✓ None ☐ Screened ☐ Blockage ☐ Deterioration	ACCEPTANCE.						
Control/Stem	Doperable Damaged Missing used to Sill canal	3						
Valve(s) cycling	☐ Frozen ☐ unknown ☐ past year ☐ frequent	4						
Size:	Material corrugated Condition well rusted, flowing full	2						
Outlet Structure	Overgrown Clean Pressurized Leaking gpm							
Secondary outlet	Yes No Type Diameter in.	1						
Comments:	needs replacing, somewhat difficult to acce	*SS						
V. Spillway	Earth Rock Concrete Other	Rating						
Modifications	None Reduction in capacity Feature not on design							
Approach Channel	Clear Trees/brush debris erosion	5						
Control Section	Width Depth Concrete	5						
Flashboards/Gate	None In place operational deteriorated	5						
Discharge Channel	Clear Trees/brush leakage headcutting ( feet approaching control section, depth feet.)							
Stilling basin	N/A Functional Minor Erosion Severe Erosion/Undercutting							
Aux. Spillway	Yes No (use comments below)							
Comments:	as-builts on file, PMF calculations remarkably improved	,						
VI. Access and Secu	rity	Rating						
Vehicle access	Public road all weather road dirt road cross country	15_						
Fencing, signage	Remote Gate Secure Fence Camera Uncontrolled	5_						
New Structure below								
Emergency Action P		3						
Comments:	EAP under development							
Instrumentation data	reviewed: N/A Yes No							
Other:								
recomme	and digging out and replacing too li	nes						
condu	it.							



Name of Dam:	Lak	<u>e Cree</u>	R					File	#: <u>L</u> -	24_
Height:	7ft. S	Storage:/_	360	ac. ft. Pe	ermit:		NID #	#: OR- <u>(</u>	0399	<u></u>
Hazard: 🔲 Lov	w 🔲 Sig	nificant 🔟	High	Reque	est Inunda	ition Ana	lysis for o	change		
Inspector(s):	Koith	- Mills.	Lyn	dsey	Crugh	an		Waterma	ster Distr	ict: <u>13</u>
Others on site: Date: 6/7	Tras	115 Kall	4, Tr	evor !	Smith	<del>,</del>				
Date: 6/7	115		_ Weatl	ner: <u>C/</u>	ear. k	not_				
Prior Inspection	n Date:	4/22/	15		Issues fro	m prior in	spection:	outle	+ pip	oe,
outlet	Struc	ture	. 10.10	known	spil	luncy	capa	city		
Expedited Re-in						•				
Rating Criteria										
2-Serious repa	ir needed	i; 1- Urgent	dam safei	ty issue – d	action nov	v - Contac	ct dam ow	ner and d	am safety	engineer
directly										
I. Dam	Ear	th 🗌 Ro	ck [	Concrete	е 🗌 (	Other			-	Rating
Up. Slope	Vegetati	on, Animals, I	Brosion, W	ave Action	, Depressio	on, Whirlpo	ool adjacen	t ou was	extourt	11
Crest	Width, S	urfacing, Veg	etation, Tr	ampling, D	epression,	Cracks, Br	eaching	on war	7 10001	4
	14',	Width, Surfacing, Vegetation, Trampling, Depression, Cracks, Breaching 14', 9rass cover								
Down. Slope	Vegetation, Animals, Erosion, Seepage, Leak (muddy), Bulge, Depression, Slide									4
R. Abutment	. Abutment Vegetation, Animals, Erosion, Seepage, Leak (muddy)									4
L. Abutment Vegetation, Animals, Erosion, Seepage, Leak (muddy)										
	grass cover								4	
Toe Vegetation, Erosion, Seepage, Leak (muddy), Boil Seepage, MUd, NO Yow									3	
Seepage/leak flo		ht gpm					er gp	m (use com	ment)	
Auxiliary dike (	s) <b>/</b>	No 🗌 Yes	<u> </u>	□ 2 □	3 🔲 4	□ 5 □	over 5			_
Comments:	C	downstr	eam	gag	e at	Lake	cree	ek		
II. Reservoir	T	ool elevatio	n: <b>-</b> 9	<i>ድ</i> ን	Point	of Refere	nce: de	am Air	acl.	Rating
Minimum freeb		Vertical distant			<u> </u>			am cr	C 5 7	/ /
Floating Debris/		Clean		d reservoir		ear spillwa		u*		7,
Log Boom		Not needed			Veeded [	Deterior		Ineffective	;	
Unusual Condit			Active La			in Waters		Other (com		
Olfabata Collars	<b>1</b>							(50777		
Comments:										
,										
III. Toe Drains	#									
Flow (gpm)										
Damage										
Sediment		- Inches								
Rating		ā6	I	1						

IV. Conduit Cor	ntrol: Manual Power Other Conduit Control missing	Rating							
Inlet	Submerged Debris on Trash Rack Deterioration								
Trickle tube	None Screened Blockage Deterioration								
Control/Stem	Operable Damaged Missing	4							
Valve(s) cycling	☐ Frozen ☐ unknown ☐ past year ☐ frequent	4							
Size:	Material Corrugated Condition poor, rusted	2							
Outlet Structure	Overgrown Clean Pressurized Leaking gpm								
Secondary outlet	Yes No Type in.								
Comments:	Leakage from holes un conduit								
V. Spillway	Earth Rock Concrete Other	Rating							
Modifications	None Reduction in capacity Feature not on design	4-							
Approach Channel	Clear Trees/brush debris erosion								
Control Section	Vidth/\(\omega\) Depth \(\sum_{\text{Concrete}}\) Concrete \(\sum_{\text{Rock}}\) Rock \(\sum_{\text{Soil}}\) Culvert \(\sum_{\text{Unstable}}\) Unstable								
Flashboards/Gate	None In place operational deteriorated								
Discharge Channel	Clear Trees/brush leakage headcutting ( feet approaching control section, depth feet.)								
Stilling basin	N/A  Functional  Minor Erosion  Severe Erosion/Undercutting								
Aux. Spillway	☐ Yes ☐ No (use comments below)	- Lander							
Comments:	5.3' vert control section to crest water level 3.9' below control section, need analy:	5/5							
VI. Access and Secu		Rating							
Vehicle access	☐ Public road ☐ all weather road ☐ dirt road ☐ cross country	5							
Fencing, signage	☐ Remote ☐ Gate ☐ Secure Fence ☐ Camera ☐ Uncontrolled	5							
New Structure below	dam Dwelling feet Paved public road feet Other sig building feet	Mark Control of the C							
Emergency Action P	lan	3							
Comments:	EAP in development								
Instrumentation data	reviewed: N/A Yes No								
Other:									



Name of Dam:	_05	borne						File	:#: <i>D=</i>	15
Name of Dam: Height:	) ft. S	Storage:	175	_ac. ft. Per	rmit:		NID #	!: OR- <u>(</u>	<u> 2040 i</u>	<u>/</u>
Hazard: Lov	v 🔲 Sig	nificant 🗾	High	Reques	st Inunda	tion Anal	lysis for c	hange		
Inspector(s):_K	eith 1	Mills, L	ynds e	y Cros	han			Waterma	aster Distri	ct: <u>/3</u>
Inspector(s): K Others on site: Date: 6/7/ Prior Inspection	Trays.	s Kelly,	Tre	<u>var š</u> i	nith					···
Date: 6/7/	16	,	Weatl	her: <u>Cle</u>	ar, I	not				<i></i>
Prior Inspection	Date:	4/22/1	5	I	ssues from	n prior ins	spection:	out	let pu	ipe_
valve c	oera	tion							•	
Expedited Re-in	spection	Needed:	Next Ins	spection Da	ate:	2017				
Rating Criteria	: 5-Very	good; 4-Ade	quate 3-M	<i>laintenance</i>	e or minor	r repair ne	eded			
2-Serious repair	ir needed	l; 1- Urgent	dam safe	ty issue – a	ction nov	v - Contac	t dam ow	ner and a	lam safety	engineer
directly										
I, Dam	Ear	th 🔲 Ro	ock [	Concrete		Other				Rating
Up. Slope		on, Animals,						t <sub>.</sub>		4
Crest	Width, S	Gurfacing, Ve	etation, Ti	rampling, De	pression,	Cracks, Br	eaching	<u></u>		11.
	Width, Surfacing, Vegetation, Trampling, Depression, Cracks, Breaching  14', grass cover  Vegetation, Animals, Erosion, Seepage, Leak (muddy), Bulge, Depression, Slide									
Down. Slope Vegetation, Animals, Erosion, Seepage, Leak (muddy), Bulge, Depression, Slide moderate cattle trampling									4	
R. Abutment Vegetation, Animals, Erosion, Seepage, Leak (muddy)									Ÿ	
L. Abutment Vegetation, Animals, Erosion, Seepage, Leak (muddy)										
Some Seepage										
Toe Vegetation, Erosion, Seepage, Leak (muddy), Boil  grass cover, pouson oak								33		
Seepage/leak flo		ght gpm	•				er gpi	n (use con	nment)	
Auxiliary dike (		No Yes					over 5			
Comments:										
Comments.										
II. Reservoir	Control of the Contro	Pool elevation				of Refere		est_		Rating
Minimum freeb		Vertical distar								4
Floating Debris/	T	Clean		nd reservoir		ear spillwa				4
Log Boom		Not neede	d 🗌 Pre	sent 🔲 N	Teeded	Deterior	ation 🗌	Ineffectiv	/e	Tects:
Unusual Condit	ions	None 🗌	Active La	andslide [	] Wildfire	in Waters	hed 🔲 (	Other (con	nments)	
Comments:		Res lev						ļ		
			10,2	be lo	w cr	est do	im			
		÷ 70	T			<u> </u>				
III. Toe Drains	#									
Flow (gpm)					<del>.</del>					
Damage Sediment										
D. 22			ļ							

IV. Conduit Cor	trol: Manual Power Other Conduit Control missing	Rating							
Inlet	☑ Submerged ☐ Debris on Trash Rack ☐ Deterioration								
Trickle tube	None Screened Blockage Deterioration								
Control/Stem	Operable Damaged Missing	4							
Valve(s) cycling	☐ Frozen ☐ unknown ☐ past year ☐ frequent rusted	4 3- 3-							
Size:	Material Corrugated Condition rusted, functional	3-							
Outlet Structure	Overgrown Clean Pressurized Leaking < 0.25 gpm	3-							
Secondary outlet	Yes No Type Diameter in.								
Comments:	Some seepage at outlet, difficult to locate outlet pipe rusted, but functional								
V. Spillway	Farth Rock Concrete Other	Rating							
Modifications	None Reduction in capacity Feature not on design	<del>-</del>							
Approach Channel	Clear Trees/brush debris erosion								
Control Section	Vidth SO' Depth Concrete Rock Soil Culvert Unstable								
Flashboards/Gate	None In place operational deteriorated								
Discharge Channel	Clear Trees/brush leakage headcutting (feet approaching control section, depth feet.)								
Stilling basin	N/A Functional Minor Erosion Severe Erosion/Undercutting								
Aux. Spillway	ay Yes No (use comments below)								
Comments:									
VI. Access and Secu	urity - The second of the seco	Rating							
Vehicle access	☐ Public road ☐ all weather road ☐ dirt road ☐ cross country	5							
Fencing, signage	☐ Remote ☐ Gate ☐ Secure Fence ☐ Camera ☐ Uncontrolled								
New Structure below	dam Dwelling feet Paved public road feet Other sig building feet								
Emergency Action P	lan								
Comments:	EAP in development								
Instrumentation data	reviewed: N/A Yes No								
Other:	unduits are badly deteriorated								



Name of Dam:	Frog P	ond#	1								
File #: H-30	S 0.			. D. 1.	WWW.com	D # 0D	125-1701				
Height: 20.00 f		-	72-7-8						2		
Hazard: Lov					Reques	st Inunda	ition Ana	lysis for c	hange		
Inspector(s): SL Date: 11/03/2016 W			master D	strict: 13							
Prior Inspection				Lam mia	u inamaatia.	Vegeta	tion and a	nimal activ	vity		
rnor inspection	Date.	00/02/20	18Sues I	rom prio	rinspection	I. vegeta	uon and a	mimai acti	vity.		
Expedited Re-in	spectio	n Nee	eded: 🗌	Next Ins	pection Da	ite					
Rating Criteria 2-Serious repaidirectly		DE PERSONAL CONTRACTOR	(C)				-		ner and de	am safety	engineer
I. Dam	✓ Ea	arth	Ro	ek [	Concrete		Other				Rating
Up. Slope	Vegeta	Vegetation, Animals, Erosion, Wave Action, Depression, Whirlpool adjacent									
Crest	Width, Surfacing, Vegetation, Trampling, Depression, Cracks, Breaching Low spot right of valve.									-4	
Down. Slope	Vegetation, Animals, Erosion, Seepage, Leak (muddy), Bulge, Depression Slide Vegetation									-4	
R. Abutment	Vegetation, Animals, Erosion, Seepage, Leak (muddy) Vegetation									-4	
L. Abutment	Vegetation, Animals, Erosion, Seepage, Leak (muddy)								-4		
Toe	Vegetation, Erosion, Seepage, Leak (muddy), Boil Vegetation									-4	
Seepage/leak flo	ow F	Right	gpm	Center	gpm	Left	gpm O	ther	gpm (use co	omment)	
Auxiliary dike (	(s) [	] No	☐ Yes		<b>√</b> 2 □ 3	3 🔲 4	<u> </u>	over 5			-4
Comments:	Di	ike #1 c	overgrow w/s	animal activ	ity. Dike #2 o	vergrow w/	low spot.				
II. Reservoir		Pool	l elevatio	n.		Doint	of Refere	mao:			Dating
Minimum freeb	oard				rom debris l						Rating
Floating Debris			Clean		ıd reservoir	A STATE OF STREET	ear spillwa	0			
Landslides/Eros		100000000000000000000000000000000000000	No activity	: 34W.		ctive slide		ve moveme	nt 🖂 Sta	bilized	
Log Boom	SIOII		Not needed	0.000		leeded [	Deterior		Ineffective		
					Sette [] Iv	recaed [			Henechy	<u> </u>	
Comments:		Not in	use.				-01-5-3				
III. Toe Drains	; #	TO A	N/A								
Flow (gpm)											
Damage										1	
Sediment											
Rating											

IIIA. Other Instrume	entation Piezometers Inclinometer(s) Ground Motion	n							
Reviewed by dam sa	afety engineer: 🔽 NA 🗌 Yes 🗌 No								
IV. Conduit Cor	ntrol: Trickle tube 🗸 Manual Valve 🗌 Power Valve 🔲 other	Rating							
Inlet gate	Submerged Functionality unknown								
Trash Rack	Submerged	4							
Control/Stem	✓ Clean ☐ Greased ☐ Irregular	-4							
Valve(s) cycling	☐ Frozen ☑ unknown ☐ past year ☐ frequent	-4							
Diameter: 8'	Material CMP Condition Oxidized with visible holes in both ends.	3							
Outlet Structure	Overgrown Clean Pressurized Leaking gpm	3							
Secondary outlet	☐ Yes ☑ No Type Diameter in.								
Comments:									
V. Spillway	Earth Rock Concrete Other	Rating							
Modifications									
Approach Channel	☐ Clear ☐ Trees/brush ☐ debris ☐ sill								
Flashboards/Gate	☐ None ☐ In place ☐ operational ☐ deteriorated								
Discharge Channel	☐ Clear ☐ Trees/brush ☐ leakage ☐ headcutting ( feet approaching control section, depth ft.)								
Stilling basin	□ N/A □ Functional □ Minor Erosion □ Severe Erosion/Undercutting								
Aux. Spillway	Yes No (use comments below)								
Comments:	No defined spillway. Flow controlled into res. by a series of ditches.								
		7							
VI. Access and Secu	urity	Rating							
Vehicle access	☐ Public road ☐ all weather road ☐ dirt road ☐ cross country	4							
Fencing, signage	☐ Remote ☐ Clear signage ☐ Secure Fence ☐ Camera ☐ Unsecure	4							
On Site Dam Tender/Contact	☐ Yes ☑ No Name: Phone:	4							
Emergency Action P	Plan	4							
Comments:									

Comments: High water mark just above outlet.
Consult us prior to resuming storage.



Name of Dam:	Bradsha	w								
File #: B-24										
Height: 47.00 f	t. Storag	e: 785.00 ac.	ft. Permit:	R-4747 NI	D#: OR-	00442				
Hazard: Lov	v 🗸 Sig	gnificant 🔲	High [	Reques	st Inunda	tion Ana	lysis for c	hange		
Inspector(s): SL	H W	/atermaster D	istrict: 13							
Date:11/03/2016 W	eather: C	Overcast								
Prior Inspection	Date: 07	<sup>7/02/2013</sup> Issues	from prior	inspection	n: Minor ro	odent activ	vity, erosio	on, and ve	getation.	
Expedited Re-in	spection	Needed:	Next Ins	pection Da	ate			1	***	
Rating Criteria. 2-Serious repaidirectly		•	•					ner and d	am safety	engineer
I, Dam									Rating	
Up. Slope	Vegetation, Animals, Erosion, Wave Action, Depression, Whirlpool adjacent Animal tracks on aux dike, small tree.								Aux:-4, Dam:-4	
Crest	Width, Surfacing, Vegetation, Trampling, Depression, Cracks, Breaching Minor vegetation obscuring inspection, low spot near outlet control.								Aux:-4, Dam:-4	
Down, Slope	lope Vegetation, Animals, Erosion, Seepage, Leak (muddy), Bulge, Depression Slide								4	
R. Abutment	Abutment Vegetation, Animals, Erosion, Seepage, Leak (muddy)								4	
L. Abutment	. Abutment Vegetation, Animals, Erosion, Seepage, Leak (muddy)									4
Toe	Vegetat	ion, Erosion, S	eepage, Le	ak (muddy)	), Boil		*			4
Seepage/leak flo	ow Ri	ght gpm	Center	gpm	Left	gpm O	ther	gpm (use c	omment)	
Auxiliary dike (	(s) [	No Yes	<b>✓</b> 1	2 🗆 3	3 🗌 4	5	over 5			4
Comments:	Do	next inspection v	vhile full.							
II, Reservoir		Pool elevation	m' Near emi	otv	Point	of Refere	nce:			Rating
Minimum freeb	DATE OF STREET	Vertical distar		•				<del></del>		4
Floating Debris		Clean		d reservoir		ear spillwa	у			4
Landslides/Eros	ion	☐ No activit	y 🔲 Gull	y 🔲 Ina	ctive slide	Activ	e moveme	nt 🔲 Sta	bilized	4
Log Boom		☐ Not neede	d 🗌 Pres	ent 🗌 N	leeded [	Deterior	ation 🗌	Ineffectiv	e	
Comments:	4	4.3' freeboard on	aux dike.							
			Τ	1			i		<u> </u>	
III. Toe Drains	Ħ	N/A								
Flow (gpm) Damage										
Sediment			:							
Rating			1							

IIIA. Other Instrume	ntation Piezometers Inclinometer(s) Ground Motion	1							
Reviewed by dam sa	fety engineer: 🔽 NA 🗌 Yes 🗌 No								
-									
IV. Conduit Con	ntrol: Trickle tube / Manual Valve Power Valve other	Rating							
Inlet gate	✓ Submerged								
Trash Rack	✓ Submerged								
Control/Stem	Clean Greased Irregular Oxidized, has not been moved recently.	3							
Valve(s) cycling	Frozen 🗸 unknown 🗌 past year 📗 frequent								
Diameter: 12	terial CMP Condition CMP corroded @ outlet								
Outlet Structure	☐ Overgrown ☐ Clean ☐ Pressurized ☑ Leaking gpm	3							
Secondary outlet	☐ Yes ☑ No Type Diameter in.								
Comments: Outlet structure severely corroded, status of gate unknown.									
V. Spillway	✓ Earth Rock Concrete Other	Rating							
Modifications	✓ None ☐ Reduction in capacity ☐ Feature not on design								
Approach Channel	✓ Clear ☐ Trees/brush ☐ debris ☐ sill								
Flashboards/Gate	✓ None ☐ In place ☐ operational ☐ deteriorated	Mark 1995 1995							
Discharge Channel	☐ Clear ☑ Trees/brush ☐ leakage ☐ headcutting ( feet approaching control section, depth ft.)	4							
Stilling basin	✓ N/A ☐ Functional ☐ Minor Erosion ☐ Severe Erosion/Undercutting								
Aux. Spillway	Yes No (use comments below)								
Comments:	Small tree growing in channel.								
		1							
VI. Access and Secu	rrity	Rating							
Vehicle access	☐ Public road ☐ all weather road ☑ dirt road ☐ cross country	4							
Fencing, signage	✓ Remote ☐ Clear signage ✓ Secure Fence ☐ Camera ☐ Unsecure	4							
On Site Dam Tender/Contact	Yes No Name: Phone:	4							
Emergency Action P	lan	4							
Comments:									

Comments: Check inundation potential around Lake Creek.

Spillway dimensions:

Control: 58.8' @ top, 41' @ base
Channel: 45.8' @ top, 27.6' @ base



Name of Dam:	Bradsha	w #2									
File #: B-83											
Height: 20.00 f	t. Storag	e: 60.00	ac. ft.	Permit:	R-4614 NID	#: OR-	00429				
Hazard: Lov	v 🗸 Sig	gnificant	Hig	gh [	Request	Inunda	tion Analy	sis for c	hange		
Inspector(s): SL	H W	Vatermast	er Dist	rict: 13							
Date:11/03/2016 W	eather: S	Sunny, co	ol								
Prior Inspection	Date: 07	7/02/2013 I <sub>SS</sub>	ues fro	m prior	inspection:	Vegitati	on and anir	nal activi	ty. Depres	ssion on o	crest.
Expedited Re-in	spection	ı Needed:	□ N	ext Insp	pection Date	<b>e</b>					
Rating Criteria 2-Serious repaidirectly									ner and do	am safety	engineer
I. Dam	<b>✓</b> Ear	rth	Rock		Concrete		Other				Rating
Up. Slope		Vegetation, Animals, Erosion, Wave Action, Depression, Whirlpool adjacent attle activity.									4
Crest	Width, Surfacing, Vegetation, Trampling, Depression, Cracks, Breaching Trampling. Cattle activity.									3	
Down. Slope		tion, Anim tivity, small		sion, Se	epage, Leak (	(muddy),	Bulge, Depi	ression S	lide		-4
R. Abutment	Vegetation, Animals, Erosion, Seepage, Leak (muddy) Cattle activity.								-4		
L. Abutment	Vegetation, Animals, Erosion, Seepage, Leak (muddy) Cattle activity.								-4		
Toe		tion, Erosic water beyon		oage, Le	ak (muddy), l	Boil					4
Seepage/leak flo	ow Ri	ight	gpm C	enter	gpm L	eft	gpm Oth	er ş	gpm (use co	omment)	
Auxiliary dike (	(s) \[	No 🗌	Yes		2 🗌 3	<u> </u>	□ 5 □ o	ver 5			
Comments:											
II. Reservoir		Pool elev	ation:	Full		Point	of Referen	ce: Spilling			Rating
Minimum freeb	oard	Vertical d	istance	debris fr	om debris lir	ne to cres	t 2.50 ft.		· /···		4
Floating Debris	/Trash	✓ Clean		Aroun	d reservoir	□ N	ear spillway				
Landslides/Eros	sion	✓ No ac	tivity	Gull	y 🗌 Inact	ive slide	☐ Active	moveme	nt 🗌 Sta	bilized	
Log Boom		✓ Not n	eeded	Pres	ent Ne	eded [	Deteriorat	tion 🗌	Ineffective	e	
Comments:		Lowest spot	right of	valve.					·		
											T
III. Toe Drains	s#	N/A									
Flow (gpm) Damage								·			
Sediment Sediment						-					1
Poting		_									

IIIA. Other Instrume	ntation Piezometers Inclinometer(s) Ground Motion						
Reviewed by dam sa	fety engineer: 🗸 NA 🗌 Yes 🗎 No						
IV. Conduit Cor	ntrol: Trickle tube 🗸 Manual Valve 🔲 Power Valve 🔲 other	Rating					
Inlet gate	✓ Submerged						
Trash Rack	✓ Submerged						
Control/Stem	✓ Clean ☐ Greased ☐ Irregular	4					
Valve(s) cycling	☐ Frozen ☐ unknown ☐ past year ☑ frequent	4					
Diameter: 5.5	Material concrete Condition weathered, but appears sound.	4					
Outlet Structure	☐ Overgrown ☑ Clean ☐ Pressurized ☑ Leaking gpm	-4					
Secondary outlet	Yes 🗸 No Type Diameter in.						
Comments:							
V. Spillway	☐ Earth ☐ Rock ✓ Concrete ☐ Other	Rating					
Modifications	✓ None ☐ Reduction in capacity ☐ Feature not on design	4					
Approach Channel	✓ Clear ☐ Trees/brush ☐ debris ☐ sill						
Flashboards/Gate	☐ None ☑ In place ☑ operational ☐ deteriorated	4					
Discharge Channel	☐ Clear ☐ Trees/brush ☐ leakage ☐ headcutting ( feet approaching control section, depth ft.)	4					
Stilling basin	✓ N/A ☐ Functional ☐ Minor Erosion ☐ Severe Erosion/Undercutting						
Aux. Spillway	☐ Yes ☑ No (use comments below)						
Comments:	Spillway 12' across, and 4.4' deep. Rectangular.						
VI. Access and Secu	rity	Rating					
Vehicle access	☐ Public road ☐ all weather road ☑ dirt road ☐ cross country	4					
Fencing, signage	✓ Remote ☐ Clear signage ✓ Secure Fence ☐ Camera ☐ Unsecure	4					
On Site Dam Tender/Contact	Yes No Name: Phone:	4					
Emergency Action P	✓ Not required ☐ Completed at dam (dated ) ☐ None						

Comments:



Name of Dam: Harrison		
File #: H-47		
Height: 26.00 ft. Storage: 500.00 ac. ft. Permit: R-4951 NID #: OR- 00460		
Hazard: ☐ Low ✓ Significant ☐ High ☐ Request Inundation Analysis for change		
Inspector(s): SLH Watermaster District: 13		
Date:11/03/2016 Weather: Overcast		
Prior Inspection Date: 07/02/2013 Issues from prior inspection: Vegetation, depression on crest, erosion on d. s	slope.	
Expedited Re-inspection Needed: Next Inspection Date		
Rating Criteria: 5-Very good; 4-Adequate 3-Maintenance or minor repair needed 2-Serious repair needed; 1- Urgent dam safety issue – action now - Contact dam owner and dam safety e directly	engineer	
I. Dam	Rating	
Up. Slope Vegetation, Animals, Erosion, Wave Action, Depression, Whirlpool adjacent Vegetation	-4	
Crest Width, Surfacing, Vegetation, Trampling, Depression, Cracks, Breaching Road improvement along crest may have lowerered the crest.	-4	
Down. Slope Vegetation, Animals, Erosion, Seepage, Leak (muddy), Bulge, Depression Slide Trees on slope.	-4	
R. Abutment Vegetation, Animals, Erosion, Seepage, Leak (muddy) Vegetation	-4	
L. Abutment Vegetation, Animals, Erosion, Seepage, Leak (muddy)  Vegetation	-4	
Vegetation, Erosion, Seepage, Leak (muddy), Boil Vegetation		
Seepage/leak flow Right gpm Center gpm Left gpm Other gpm (use comment)		
Auxiliary dike (s) No Yes 1 2 3 4 5 over 5		
Comments: Dike left of control heavily wooded		
II. Reservoir Pool elevation: Point of Reference:	Rating	
Minimum freeboard Vertical distance debris from debris line to crest ft.		
Floating Debris/Trash		
Landslides/Erosion		
Log Boom Not needed Present Needed Deterioration Ineffective		
Comments:	_,,,	
HI. Toe Drains#		
Flow (gpm)		
Damage Stationart		
Sediment Rating		

IIIA. Other Instrumentation Piezometers Inclinometer(s) Ground Motion			
Reviewed by dam safety engineer:  NA Yes No			
IV. Conduit Con	ntrol:  Trickle tube  Manual Valve Power Valve other	Rating	
Inlet gate	✓ Submerged Closed.		
Trash Rack	✓ Submerged		
Control/Stem	Clean Greased Irregular Rusted, uncased, and partially buried.	-4	
Valve(s) cycling	☐ Frozen ✓ unknown ☐ past year ☐ frequent	-4	
Diameter: 14	Material Cemt.Encased CMP Condition Oxidized and partially buried.	4	
Outlet Structure	☐ Overgrown ✓ Clean ☐ Pressurized ☐ Leaking gpm	4	
Secondary outlet	☐ Yes ☑ No Type Diameter in.		
Comments:			
V. Spillway	Earth Rock Concrete Other	Rating	
Modifications	□ None □ Reduction in capacity □ Feature not on design		
Approach Channel	☐ Clear ☐ Trees/brush ☐ debris ☐ sill		
Flashboards/Gate	✓ None ☐ In place ☐ operational ☐ deteriorated		
Discharge Channel	☐ Clear ☐ Trees/brush ☐ leakage ☐ headcutting ( feet approaching control section, depth ft.)		
Stilling basin	□ N/A □ Functional □ Minor Erosion □ Severe Erosion/Undercutting		
Aux. Spillway	Yes No (use comments below)		
Comments:			
VI. Access and Secu		Rating	
Vehicle access	☐ Public road ☐ all weather road ☑ dirt road ☐ cross country	4	
Fencing, signage	✓ Remote ☐ Clear signage ☐ Secure Fence ☐ Camera ☐ Unsecure	4	
On Site Dam Tender/Contact	Yes No Name: Phone:	4	
Emergency Action P	lan	4	
Comments:			

Comments: Road work along crest may have lowered crest height. Be sure to contact us prior to resuming use of dam for further inspection.